



**ENVIRONMENTAL LIABILITY MANAGEMENT, INC.**

---

Buckingham Green II  
4920 York Road, Suite 290  
P.O. Box 306  
Holicong, PA 18928-0306  
Tel: (215) 794-6920  
Fax: (215) 794-6921  
www.exploreELM.com

*Corporate Office*

Princeton, NJ

March 18, 2009

**-- Via Email and FedEx --**

Mr. Doug Tomchuk  
USEPA  
290 Broadway, 19<sup>th</sup> Floor  
New York, NY 10007-1866

**RE: Berry's Creek Study Area (BCSA) – Notification of Remedial Investigation/Feasibility Study  
(RI/FS) Contractor**

Dear Mr. Tomchuk:

In accordance with paragraph 29 of the Administrative Settlement Agreement and Order on Consent (AOC) for RI/FS BCSA, this letter serves as notification of the selection of a subcontractor for a portion of the RI/FS activities. The BCSA Cooperating PRP Group's (Group) contractor Geosyntec Consultants, Inc. (Geosyntec) has selected Germano and Associates, Inc. to perform sediment profile imaging (SPI) activities as part of the RI/FS.

Germano has strong qualifications in Sediment Profiled Imaging that is applicable to the BCSA work. Attachment A presents a summary of Germano's qualifications and qualifications of key personnel (resumes) undertaking the Work for the Group.

If you have any questions regarding this contractor's qualifications, please do not hesitate to contact me. Subsequent submittals will identify the additional subcontractors that will be part of the RI/FS project team.

Sincerely,  
ENVIRONMENTAL LIABILITY MANAGEMENT, INC.

Peter P. Brussock, Ph.D.  
Project Coordinator

PPB:ng

Enclosures

c: Gwen Zervas, NJDEP

335905



## **Attachment A**

## **QUALIFICATIONS OF GERMANO & ASSOCIATES TO PROVIDE SEDIMENT PROFILE IMAGING SERVICES FOR THE BCSA RI/FS**

### **FIRM NAME AND ADDRESS**

Germano & Associates, Inc.  
12100 SE 46th Place  
Bellevue, WA 98006

**Phone:** 425.865.0199  
**Cell:** 425.891.2121  
**Fax:** 425.865.0699  
**E-mail:** joe@remots.com

### **PROJECT ROLE**

Germano & Associates (Germano) will provide Sediment Profile Imaging (SPI) services for the Berry's Creek Study Area Remedial Investigation/Feasibility Study (BCSA RI/FS) Phase 1 effort. Germano will be responsible for both the collection of field data and interpretation of the collected data (images). SPI is a photographic technique used to rapidly profile sediment characteristics. An information sheet on the technology is included as Attachment 1. The primary objective of the BCSA RI/FS Phase 1 SPI effort will be to assist in determining the biologically active zone (BAZ) of the identified investigation areas.

### **QUALIFICATIONS OF GERMANO & ASSOCIATES**

Germano & Associates, Inc. (G&A) is the nation's foremost provider of SPI technology. The head of the G&A is one of the developers of the technology. During the past 20 years, G&A has analyzed more than 30,000 sediment-profile images from fresh water, estuarine, continental shelf and slope, and deep-sea environments.

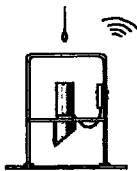
As an example of a similar SPI effort, as part of a multi-disciplinary RI/FS investigation of the Lower Willamette River, G&A performed a baseline characterization of the lower 15.7 miles of the river using SPI. The SPI results provided reconnaissance information on the physical and biological features of surface sediments in the Willamette River from Ross Island to the Columbia River. A total of 514 stations were sampled.

Additional project descriptions, and information on the firm, is available on Germano's web site (<http://www.remots.com/index.html>).

### **RESUMES OF KEY PERSONNEL**

Resumes of key Germano personnel to be involved in this project are included as Attachment 2.

## **Attachment 1**



**Germano &**  
Associates, Inc.

# Sediment Profile Imaging (SPI)

*Rapid Seafloor Reconnaissance and Assessment*

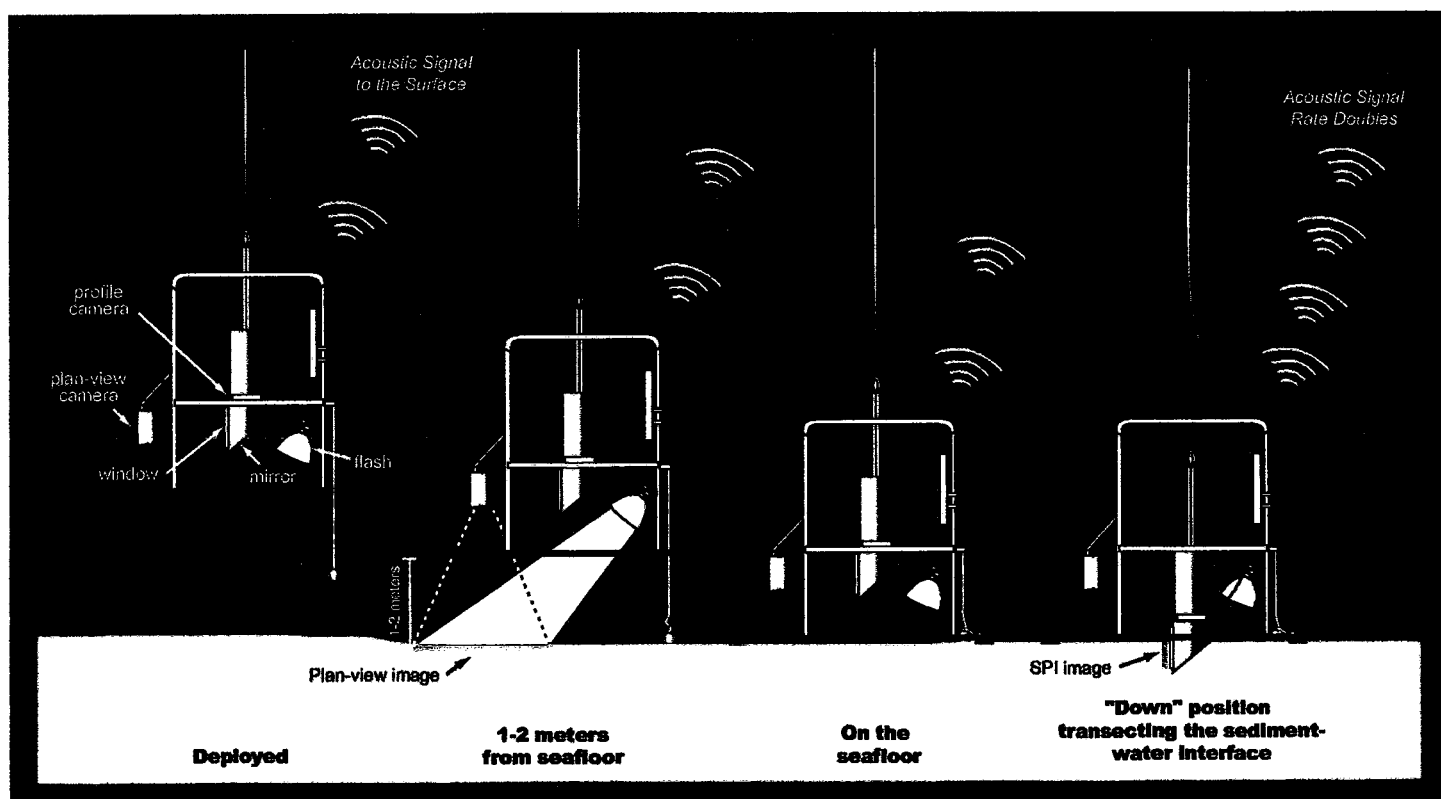
## Sediment Profile Imaging -

provides an alternative approach to traditional sampling technologies and is a rapid, cost effective method for mapping changes in the surface of the seafloor. This innovative optical technique can quickly image, measure, and analyze physical, chemical, and biological parameters over large areas of the bottom of lakes, rivers, estuaries, and oceans.

## What Does SPI Measure?

The digital images are rapidly analyzed by a computer image analysis system. The software allows rapid measurement and storage of a wide variety of imaged features from each photograph, including:

- Grain size - major mode and range
- Small-scale surface boundary roughness
- Dredged-material or drilling mud thickness
- Depth of the apparent redox potential discontinuity (RPD)
- Erosional or depositional features such as ripples, mud clasts, and laminated or bedded intervals
- Subsurface methane gas pockets
- Epifauna
- Tube density of benthic infauna (number per linear cm)
- Thickness of pelletal layers
- Surface aggregations of bacteria
- Infaunal successional stage



*For more information on our SPI capabilities, please call Dr. Joseph Germano.*

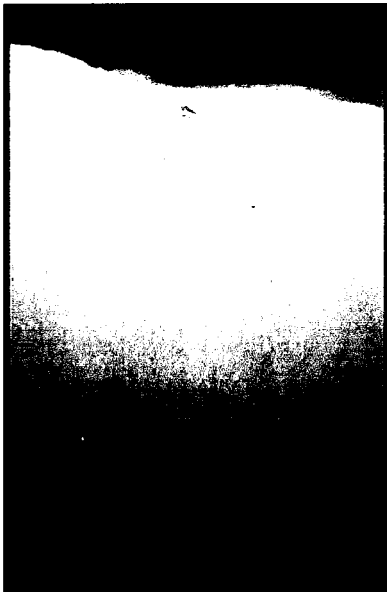
## Applications:

SPI technology has a long history of successful applications for:

- *Reconnaissance surveys to develop the most efficient grab or box core sampling design*
- *Sediment quality surveys and identification of pollution "hot spots"*
- *Dredged material site designation studies*
- *Confined and unconfined ocean disposal site monitoring*
- *Assessment of low dissolved oxygen*
- *Aquaculture impact assessment*
- *Oil platform impact assessment*
- *Coastal municipal sewage discharge impact assessment*
- *Industrial discharge (pulp and paper mill, log storage and transfer facilities, mine tailings, etc.) impact assessment*

## SPI Technology Will Allow You To:

- *Collect and analyze data rapidly and cost effectively*
- *Develop technically defensible response materials*
- *Create economical sampling designs for expensive ground-truth samples*
- *Achieve broad area coverage (to supplement traditional chemical and biological samples)*
- *Convey ecological information in a clear, unambiguous format, that is easily understandable by the public*



**An SPI photograph from a healthy mud bottom shows a sub-surface feeding void from a community of deposit-feeding marine worms.**



**An SPI photograph taken in the vicinity of a fish farm shows the effects of organic enrichment: a 3-cm thick layer of anoxic waste from the fish pens is covering the seafloor and preventing any oxygen from reaching the underlying sediment.**



## Technical Details

- High resolution digital images instantly available in the field (10 megapixel CCD array with 12-bit RGB color)
- Deep sea digital plan-view camera (6 megapixel) can be added to the SPI frame (see photo above) with bottom contact switch for acquisition of seafloor surface image before frame lands
- Camera depth rated to 4,000m
- Rapidly shipped via air freight to any location
- Easily deployed from vessels of opportunity (only requires a winch)
- Capacity to do time-lapse imaging at 5 or 60-minute intervals
- Replicate images collected in less than a minute
- Sediment profile image quality is never affected by water turbidity; clear, high-resolution images always obtained

## Germano & Associates, Inc.

Contact Joe Germano  
President

Telephone: 425.855.0199

Mobile: 425.891.2121

Fax: 425.855.0699

E-mail: joe@germano.com

Address: 12100 38th Ave

Bellevue, WA 98006

www.germano.com



## **Attachment 2**

### Education

Ph.D., Biology, Yale University, 1983  
M.Phil., Biology, Yale University, 1980  
A.B., *magna cum laude*, Biology,  
Harvard University, 1973

### Areas of Specialization

Sediment Profile Imaging  
Benthic Ecology/Organism-Sediment  
Relationships  
Statistics & Sampling Design  
Contaminated Sediment Management  
Dredged Material Management &  
Monitoring  
Confined Aquatic Disposal  
Management  
Environmental Impact Assessment  
Ecological Risk Assessment  
Environmental Mediation

### Professional Memberships

Estuarine Research Federation  
Pacific Estuarine Research Society  
Western Dredging Association  
Society of Environmental Toxicology  
and Chemistry (SETAC)

### Employment History

**2001 - present** - President, Germano &  
Associates, Inc., Bellevue, WA  
**1996 - 2001**: Director, Marine  
Environmental Studies, EVS  
Environment Consultants, Inc.  
Seattle, WA  
**1995 - 1996**: Associate Director, Arthur  
D. Little, Cambridge, MA  
**1985 - 1995**: Division Manager,  
Assistant Vice President,  
Science Applications  
International Corporation,  
Newport, RI  
**1981 - 1985**: President and CEO,  
Marine Surveys, Inc., New  
Haven, CT

### Experience Summary

Dr. Germano is a marine ecologist with more than 20 years of experience in domestic and international marine environmental programs. His technical expertise is in the areas of benthic ecology, organism-sediment relationships, ecological risk assessment, statistics and the design of sampling strategies, and environmental impact assessment of ocean disposal. As one of the originators of REMOTS technology, an innovative seafloor reconnaissance sampling technique combining Sediment Profile Imaging (SPI) with computer image analysis, he has pioneered its application in seafloor monitoring studies on all coasts of the United States as well as in Europe, Asia, and New Zealand. Dr. Germano is recognized as one of the leading authorities in SPI image analysis and interpretation. During the past two decades, he has performed or supervised the interpretation of more than 30,000 SPI images collected from a wide diversity of estuarine, oceanic, and freshwater sites throughout the world. His project experience includes environmental baseline, impact, and site designation studies for diverse open-water dredged-material disposal projects and sediment quality surveys in a number of estuaries.

Dr. Germano has broad expertise in diverse aspects of marine biology and ecology, oceanographic sampling, sampling design and statistics, data analysis, and program management for offshore, estuarine, and coastal environmental impact analysis, monitoring, and research. He is recognized as a leading international authority on environmental impacts of ocean disposal of dredged material, and has served as an advisor to international governmental agencies on the environmental impacts of contaminated sediment disposal. Dr. Germano has also testified as an expert witness on the physical, chemical, and biological impacts of dredged material disposal for congressional hearings as well as state and federal court cases.

---

### WORK EXPERIENCE

- ***Environmental Assessment***

#### Wood Waste Investigations, Puget Sound

Dr. Germano was principal investigator for SPI surveys at Port Gamble and in the Hylebos waterway for industrial clients to both characterize the extent of wood waste at former log rafting/transfer sites and assess the status of benthic recovery in these areas. The results from the SPI surveys were used to delineate the extent of wood waste impacts and provide a rapid characterization of the status of the benthic community.



San Francisco Deep Ocean Disposal Site (SFDODS) Monitoring

SF-DODS is the nation's deepest offshore disposal site located in over 3000 meters of water off the California coast; Dr. Germano was the principal investigator for the sediment profile imaging survey carried out as part of the annual monitoring in 2007. As a subcontractor to ENSR, the scientists from Germano & Associates assisted with the box coring tasks for benthic and chemistry samples in addition to collecting 3 replicate images at all 30 of the deep-water stations.

Seafood Waste Pile Assessment, Dutch Harbor

In the spring of 2007, Dr. Germano was the chief scientist and principal investigator for a private client to assess the success of a seafood waste pile cleanup at a remote inlet outside of Dutch Harbor, AK. A precision bathymetric survey combined with sediment profile and plan-view imaging accurately mapped the remaining seafood waste remaining on the bottom at the former disposal site as well as provided the client with an accurate assessment of benthic recolonization status in the affected area. The complete results of both the acoustic and optical surveys were turned into the client and presented to federal regulatory authorities within 30 days following completion of the field survey.

Retrospective Data Review and SMMP Revision for SF-DODS, EPA Region 9

Under contract to EPA Region 9 in 2006-2007, Dr. Germano assembled a team of experts to review all monitoring data collected at the San Francisco Deep Ocean Disposal Site from 1993-2007 to summarize results and recommend changes to the site's monitoring and management plan. As a result of our report, EPA was able to implement a rule change and streamline the monitoring plan to collect monitoring data in a much more cost-effective manner.

Alaska DEC 303(d) List Monitoring in Schulze Cove and Thorne Bay

Dr. Germano was the chief scientist and principal investigator for the benthic and sediment profile imaging survey at former log transfer and storage areas in Thorne Bay and Schulze Cove, Alaska. As part of a team under a multi-year environmental task order services contract with Alaska DEC, Germano & Associates performed all sediment chemistry and benthic sampling in addition to sediment profile and plan-view imaging in May, 2007, to assess the nature and extent of impacts associated with wood waste on the seafloor.

Sediment Quality Survey, Hackensack River, New Jersey

Dr. Germano was the chief scientist and principal investigator for a private client to assess sediment and benthic habitat quality at an industrial site on the Hackensack River; a comprehensive profile imaging survey was carried out in 2006 with complete results submitted to the client within 4 weeks of completing the field survey.

RI Baseline Characterization, Saginaw River, Michigan

Dr. Germano was the chief scientist and principal investigator for the sediment profile imaging survey performed as part of a baseline characterization for a remedial investigation performed in the fall of 2007 along 22 miles of the Saginaw River; over 1300 sediment profile images were collected during 7 days in the field with a complete analysis and comprehensive report submitted to the client in early 2008.

Measurement of Biological Mixing Depth, Housatonic River, MA

Dr. Germano was the chief scientist and principal investigator for a sediment profile imaging survey at selected areas in the Housatonic River under contract to Weston Solutions, Inc. in the spring of 2006. Approximately 50 stations were sampled over the course of two days along the upper reaches of the river near Pittsfield, MA to measure biological mixing depth to assist EPA in their water quality modeling efforts. Results were submitted to the client within one week following completion of the field work.

Port Everglades and Miami ODMS Monitoring, EPA Region 4

Dr. Germano was the chief scientist for the sediment profile and plan-view imaging surveys at the Port Everglades and Miami Ocean Dredged Material Disposal Sites in the spring of 2006. Over 50 stations were surveyed at the two sites under contract to EPA Region 4. A complete interpretive report was submitted to the client showing the spread of dredged material at both sites as well as the status of benthic recolonization within the site boundaries.

Eutrophication and Benthic Habitat Assessment, Jamaica Bay, NY

Dr. Germano was one of the key investigators for the sediment profile imaging survey performed as part of the multi-year, comprehensive benthic eutrophication studies carried out in Jamaica Bay for NY DEP. Germano & Associates was a subcontractor to Battelle Memorial Institute for the spring and summer surveys carried out each year between 2005—2007; approximately 50 sediment profile stations were sampled each season with multi-year comparisons performed in the latter years to look at both annual and seasonal changes in benthic community response to eutrophication patterns in this shallow bay in Long Island.

Thorne Bay Bark and Benthic Assessment

Dr. Germano was the chief scientist and principal investigator for the benthic and sediment profile imaging survey at a former log transfer facility in Thorne Bay, Alaska. As a subcontractor to Tetra Tech for TMDL support to the Alaska Department of Environmental Conservation, Germano & Associates performed all water and sediment sampling in addition to sediment profile and plan-view imaging in June, 2005, to assess the nature and extent of impacts associated with wood waste on the seafloor.

Evaluation of Sediment and Benthos Characteristics at a Proposed LNG Deep Water Port

Dr. Germano was the principal investigator for a comprehensive sediment profile imaging survey as part of a permit application baseline study for a proposed pipeline route and deepwater port associated with an LNG offloading terminal for a facility on the east coast of the United States. A total of 160 stations were surveyed in July 2005 in a range of water depths between 200-300 feet, and a complete report and interpretation of all profile images was submitted to the client within 30 days following completion of the field survey.

Habitat Restoration Project, Woodard Bay, Puget Sound

In May, 2005, Dr. Germano was the principal investigator for a combination SPI/plan-view survey of a former log storage area in Puget Sound that was scheduled to undergo a restoration for oyster habitat by the Nature Conservancy. The proposed area was surveyed in one day of field work, and the results of the SPI and plan-view camera analysis to determine whether or not the proposed area was suitable for oyster habitat were submitted to the client within 2 weeks of completion of the field work.

Caspian Sea Environmental Surveys

Dr. Germano was the principal investigator for post-drilling sediment profile imaging surveys at two areas in the Caspian Sea in November, 2004, as part of a larger project conducted by Germano & Associates to perform sediment and water sampling for ExxonMobil. This study was performed to assess environmental impacts of two exploratory wells drilled in 600 and 800 meters water depths. A complete report and interpretation of all sampling activities was submitted to the client within 90 days following completion of the field surveys.

Hunters Point Survey

Dr. Germano was the principal investigator for a sediment profile imaging study for the US Navy SPAWARS division to look at contaminant remediation in marine sediments off Hunters Point Naval

Shipyards in San Francisco Bay. The results of the sediment profile survey performed in May 2004 were used to measure bioturbation depth in order to more accurately model natural recovery.

#### Effects of Dredging-Induced Sedimentation

As part of an ongoing research effort at the US Army Corps' Waterways Experiment Station (WES), Dr. Germano was in charge of convening a panel of experts in a variety of marine disciplines to help define priorities for WES's research program to investigate the biological impacts of sedimentation caused by dredging projects. The results of the workshop were summarized in ERDC TN-DOER-E19 to address questions about the appropriate scales of concern for biological response to sediment deposition, the requirements for modeling, and methods for measuring deposition in both field and laboratory situations.

#### Disposal Area Monitoring (DAMOS) Survey

Dr. Germano was in charge of SPI surveys between 2003- 2011 as a subcontractor to ENSR to investigate the impacts of dredged material placement at a series of open water disposal sites off the coasts of Maine, Massachusetts, and Connecticut. Responsibilities included field operations for successful acquisition of profile images as well as analysis & interpretation of the images for the final reports.

#### Oil Platform Monitoring, Bay of Campeche

Dr. Germano was the principal investigator for all sediment profile imaging studies to assess the environmental impacts surrounding several oil platforms off the coast of Mexico in the Bay of Campeche. A total of 126 stations were sampled as part of a multidisciplinary study being carried out by Battelle and IMP for PEMEX in December of 2003, with data analysis and interpretation completed in 2004.

#### Puget Sound Naval Shipyard CAD/ENR Study

Dr. Germano was principal investigator for SPI surveys at both the Confined Aquatic Disposal (CAD) pit and the Enhanced Natural Recovery (ENR) areas at the Bremerton Naval Complex in Sinclair Inlet, Puget Sound in October, 2003. Over 160 stations were sampled and results submitted to the client within one month after completion of all field work.

#### Ketchikan Fish Waste Monitoring

Dr. Germano was in charge of benthic studies and SPI surveys to assess the recolonization status of fish waste disposal sites in Tongass Narrows off Ketchikan, Alaska in the fall of 2003. SPI technology was used to delineate the extent of four disposal piles, and benthic grabs were taken at two disposal piles and a reference site. Both the SPI results and benthic community data were integrated for the final report to provide an assessment of overall benthic community health.

#### El Paso Gas Pipeline Environmental Impact Assessment

In November, 2002, Dr. Germano led a study to perform a sediment profile imaging survey at over 200 locations along a proposed gas pipeline route off the coast of New Jersey and New York to document benthic habitat baseline conditions. Field work was successfully completed over the course of two weeks and a final report characterizing sediment and benthic community conditions along the entire pipeline route was completed on schedule.

#### Gas Pipeline Baseline Characterization Study, West Africa

In December, 2002, Dr. Germano was principal investigator for the sediment profile imaging portion of a multidisciplinary baseline study along 150 km of a proposed pipeline route off the coast of Africa; over 150 sediment profile images were taken and assessed on board to decide where additional grab sampling stations should be located. A complete image analysis and comprehensive report was submitted within 45 days following completion of the field work.

Confined Aquatic Disposal Monitoring, Sinclair Inlet, Puget Sound

During the summer of 2002, Dr. Germano performed a sediment profile imaging survey of the confined aquatic disposal borrow pit adjacent to the Puget Sound Naval Shipyard in Bremerton, WA. The survey was performed for the US EPA to investigate the cause of elevated contaminant concentrations found in sediment samples from the nearby seafloor taken after capping operations were completed. The SPI survey showed that the dredged material apron extended over 200 meters beyond the designated CAD pit boundary.

Post-Drilling EIA Monitoring, Caspian Sea

In September 2002, Dr. Germano was in charge of a comprehensive mapping survey to delineate the footprint of drilling muds/cuttings surrounding three former oil well sites in the Caspian Sea off the coast of Azerbaijan. The sediment profile imaging survey documented the lateral extent of drilling muds on the seafloor in depths from 70 – 500 meters; SPI technology was used at all three sites to map the footprint of the muds. The film was developed immediately on-board following completion of the reconnaissance SPI survey, and the results were used to plan the location of the grab samples taken for sediment chemical and biological analyses.

Capping Demonstration Project, Los Angeles Harbor

As part of a comprehensive capping demonstration project in Los Angeles Harbor being carried out for the US Army Corps of Engineers, Los Angeles District in coordination with the Contaminated Sediments Task Force, Dr. Germano carried out baseline, post-disposal, and post-capping monitoring surveys using Sediment Profile Imaging technology in the summer and fall of 2001. Approximately 40 stations were monitored in this time-series to study the effectiveness and impacts of confined aquatic disposal as a management tool for contaminated sediments.

Sediment Profile Imaging Survey, Lower Willamette River

As part of a multi-disciplinary RI/FS investigation of the Lower Willamette River, Dr. Germano was the program manager for a baseline characterization of the lower 15.7 miles of the river using sediment profile imaging technology. The report produced from this study was a required deliverable under the Stipulated Agreement for Portland Harbor which was incorporated by reference into the Administrative Order on Consent for the Portland Harbor CERCLA Site. The SPI results provided reconnaissance information on the physical and biological features of surface sediments in the Willamette River from Ross Island to the Columbia River. A total of 514 stations were sampled between November 26 and December 10, 2001.

PSDDA Disposal Site Monitoring

Under subcontract to Striplin Environmental Associates, Dr. Germano was in charge of all SPI monitoring at the Commencement Bay and Elliott Bay Disposal Sites in 2001 and 2002. Between 50-70 sediment profile imaging stations were sampled at each site, with maps of the dredged material footprint submitted to the client within 24 hours of the field sampling; a comprehensive report on the profile imaging results was submitted within 4 weeks of completion of the field work at each site.

Comprehensive Environmental Impact Baseline Survey, People's Republic of China

Dr. Germano carried out a comprehensive SPI survey in the fall of 2001 as part of a multi-disciplinary environmental impact study for an industrial client in the People's Republic of China. A baseline characterization of an entire bay over 650 km<sup>2</sup> in area was surveyed using Sediment Profile Imaging as a requirement for building a large industrial coastal facility. Field work was completed within one week, and a complete analysis/report delivered to the client within 5 weeks of completion of all field activities.

Contaminated Sediment Workgroup, San Francisco Estuary Institute

Dr. Germano served as an invited workgroup member to assist SFEI with their investigations of the transfer of contaminants from sediments to biota in San Francisco Bay. As part of this panel, Dr. Germano attended meetings, provided expertise on bioturbation and animal-sediment relationships, and reviewed SFEI's PCB fate and transport model.

Gulf of Mexico Deep-Water Monitoring Studies

In the summer of 2001, Dr. Germano carried out a comprehensive series of Sediment Profile Imaging surveys as a subcontractor to Virginia Institute of Marine Sciences at three monitoring sites in the Gulf of Mexico in water depths ranging from 900-1200 meters. Over 1,300 sediment profile images were collected as part of a multidisciplinary sampling program to investigate the environmental impacts of synthetic drilling muds on the seafloor.

SPAWARS PRISM Project: Field Verification of Bioturbation Depths

The Navy is in the process of identifying, assessing, and remediating a large number of coastal facilities with contaminated sediments; as part of this effort, the PRISM project is developing a set of diagnostic tools for characterizing and quantifying in-place contaminant pathways to aid in the effective selection, permitting and monitoring of *in-situ* sediment management strategies. Dr. Germano served as principal investigator for all sediment profile imaging surveys as part of this multidisciplinary, comprehensive program development carried out in San Diego Harbor, CA and Pearl Harbor, Hawaii in 2001-2002.

Ecological Impacts of Potential New Jersey Sand Mining Operations, Minerals Management Service

As a subcontractor to Continental Shelf Associates, Dr. Germano was principal investigator for Sediment Profile Imaging (SPI) surveys as part of baseline ecological assessment of potential sand resource mining areas off the coast of New Jersey carried out in 2001.

Ecological Assessment of Sand Mining Impacts, Civil Engineering Dept.

Dr. Germano was program manager and principal scientist for an environmental impact assessment of the South Cheung Chau disposal site and East Lamma Channel sand mining operation, February-March 2001, for the Civil Engineering Department, Hong Kong. This project used SPI technology to assess environmental impacts and verified deposition and dispersion pattern of suspended sediments from hopper dredging operations for sand mining associated with the new Disney theme park in Penny's Bay, Hong Kong.

Silver Bay Baseline Monitoring, City and Borough of Sitka, Alaska

Dr. Germano was program manager for a comprehensive baseline survey of Sawmill Cove in Silver Bay, Alaska for the City and Borough of Sitka. He directed comprehensive underwater video and sediment profile imaging (SPI) surveys of a 100 acre site, interpreted SPI results and designed a sediment sampling strategy with a follow-up survey for traditional benthic community analyses to document baseline conditions and ecosystem recovery as well as presenting the final results to City officials, Alaska Department of Environmental Conservation, and the interested public.

Port of Oakland 50' Deepening Project

Dr. Germano was the program manager for sediment analyses for the Port of Oakland's 50-ft Harbor Deepening Project. He developed sampling and analysis plans, negotiated with relevant state and federal regulatory agencies for plan approvals, managed the collection and analysis of more than 200 vibracores to -52 ft, interpreted sediment testing results, directed the preparation of all reports/deliverables, and supported the Port in public outreach meetings. He also performed a reconnaissance survey using

Sediment Profile Imaging (SPI) technology to characterize an area in Oakland Middle Harbor earmarked for habitat restoration using dredged material to create a shallow-water eelgrass habitat with associated nearshore wetlands.

Monitoring Survey of LA2 and LA3 Disposal Sites, US Army Corps of Engineers, Los Angeles District

Principal Investigator, August 2001, in a comprehensive sediment profile imaging survey at the LA2 and LA3 disposal sites to map distribution and impacts of dredged material disposal for the LA Corps of Engineers. Over 200 stations were sampled in one week, with preliminary results of the dredged material footprint given to the client by the end of that same week.

Housatonic River Baseline Ecological Risk Assessment, EPA Region I

Program Manager for aquatic components of the BERA; EVS was brought in to this on-going study in summer of 2000 to handle the data analysis/interpretation for the benthic community studies, the sediment quality triad studies, and to be the study lead for all the aquatic components of the comprehensive BERA being performed. As the EVS' program manager, Dr. Germano organized and directed all of EVS' technical tasks, presented position papers on the EPA team approach to joint EPA/PRP meetings, and participated in the overall EPA team meetings held periodically in Pittsfield, MA up until the time he left EVS in 2001.

Seabed Ecology Program, Civil Engineering Department

Principal investigator for Hong Kong's Seabed Ecology Program, an 18-month project initiated in 1996 and sponsored by the Geotechnical Engineering Office of the Hong Kong government to address the cumulative environmental impacts of the many marine dredging and disposal projects under its jurisdiction. Supervised statistical analysis of all available historical data to refine the study objectives, supplied all SPI technology services (data acquisition in Hong Kong, analysis, and interpretation in Seattle) for the study program, supplied field technicians to assist with benthic grab sampling, provided interpretation and statistical analysis of all the biological community grab sample results, integrated the SPI results with benthic community data to provide insights into the structure and function of benthic communities at the disposal mounds and capped borrow pits, and attended meetings with government officials in Hong Kong to present program results.

Ecological Impacts of Potential North Carolina Sand Mining Operations, Minerals Management Service

As a subcontractor to Continental Shelf Associates, Dr. Germano was principal investigator for Sediment Profile Imaging (SPI) surveys as part of baseline ecological assessment of four potential sand resource mining areas off the coast of North Carolina carried out in 1998.

Independent Review of Bolsa Chica Ecological Risk Assessment Work Plan, US Army Corps of Engineers, Los Angeles District

Program manager for a comprehensive review of a proposed risk assessment for the Bolsa Chica Wetlands Restoration project in southern California. The task also included developing alternative strategies for a site-specific ecological risk assessment as part of site's wetlands management plan.

Hong Kong Coastal REMOTS® Survey

Directed a series of comprehensive Sediment Profile Imaging (SPI) surveys of Hong Kong coastal waters between 1993 -1995 for the Geotechnical Engineering Office (GEO) of the Hong Kong Government's Civil Engineering Department. A total of 800 SPI images were collected at various locations in Hong Kong's coastal waters as a demonstration project to see if SPI technology would be useful for the government's marine environmental monitoring program. A variety of dredged material disposal sites were investigated as well as areas under investigation as part of the Chep Lap Kok airport reclamation project. The results showed that overall, the sedimentary facies of Hong Kong/Kowloon shelf represent

moderately high kinetic energy regimes where surface bottom instability is the rule rather than the exception. While evidence of increasing organic enrichment and a compromised benthic community indeed were documented in a few areas (e.g., Fairway and Tathong transects), most of the areas surveyed show little evidence of stress or impact at a population level of functional trophic groups and animal-sediment interactions. The results showed that SPI technology was indeed an appropriate monitoring tool for Hong Kong's territorial waters and a series of SPI surveys were carried out over the next 2 years as part of the comprehensive monitoring program to assess dredging impacts in Hong Kong territorial waters.

Dredged Material Disposal Impact Assessment, Mud Dump Site, New York

Managed a variety of investigations for the U.S. Army Corps of Engineers (ACOE) New York District assessing the effectiveness and stability of capping dioxin-contaminated sediments, and biological community characteristics at the Mud Dump Site. Supervised geophysical investigations to support alternate disposal site selection in the New York Bight region for ACOE and USEPA.

Field Studies to Support ERA at a Coastal Superfund Site, Industrial Client

Supervised sediment vibracoring in a coastal wetland at an industrial Superfund site for advanced chemical fingerprinting of sediment hydrocarbon contaminants.

Disposal Area Monitoring System (DAMOS) Investigations, New England Division, US Army Corps of Engineers

Program manager 1985-1991 of the Disposal Area Monitoring System (DAMOS) contract for the New England Division of ACOE, the most comprehensive, long-term, multi-disciplinary environmental monitoring program for open water dredged material disposal in the United States. Played a major role in adapting existing technology and developing new technology to allow accurate and expedient monitoring of dredged material disposal to assess water quality impacts; performed extensive physical oceanographic monitoring; and measured both short- and long-term effects on sediment quality, benthic fauna, macrofauna, and fish communities. Was responsible for design and interpretation of numerous sediment profile imaging surveys at active disposal sites. Designed and implemented numerous studies to investigate the effectiveness of capping as a remediation alternative for contaminated sediment disposal; played a key role in developing the program's overall long-term tiered monitoring and management strategy.

San Francisco Deep Water Disposal Site Ocean Studies, US EPA Region IX

Managed a comprehensive ocean studies program for the deep-water disposal site located off the Farallone Islands for USEPA Region IX and designed the long-term monitoring program for the site.

Outfall Siting Studies, Massachusetts Water Resource Authority

Managed comprehensive REMOTS® surveys for baseline characterization of potential sites for locating discharge pipes for sewage effluent from a Massachusetts sewage treatment plant.

Sediment Quality Survey, San Francisco Bay, NOAA

Program manager for a sediment quality survey and baseline gradient characterization of San Francisco Bay for NOAA's Status and Trends Program using REMOTS® technology and traditional sampling methods.

Sediment Quality Survey, Pensacola & Hillsborough Bay, Florida DER

Applied REMOTS® technology to characterize benthic habitat gradients in Pensacola and Tampa for the Florida State Department of Environmental Regulation.

Dredged Material Site Designation Studies, Chesapeake Bay & Puget Sound, US Army Corps of Engineers

Managed programs and served as principal investigator on baseline assessments of bedforms, sediment type, and biological communities as part of site designation studies in Puget Sound and in Chesapeake Bay for the ACOE Seattle and Baltimore Districts respectively.

Sediment Quality & Habitat Assessment Studies, Various Clients

Principal investigator on sediment profile imaging surveys for sewage disposal effluent impacts, pulp/paper mill discharge impacts, offshore oil and gas platform discharge impacts, dredged material disposal (confined, unconfined, and thin layer disposal) impacts, aquaculture impact, anoxia/hypoxia assessment, and identification of pollution "hot spots" in shallow and deep water on all coasts of the United States plus locations in Canada, UK, Ireland, France, Spain, Hong Kong, and New Zealand.

• ***Guideline & Protocol Development***

Development of Beneficial Re-Use Sediment Screening Guidelines, San Francisco

Managed program as well as being one of the principal investigators for the San Francisco Regional Water Quality Control Board, Port of Oakland, and California Coastal Conservancy during 2002-2003 to develop new screening guidelines for beneficial re-use of dredged material for wetland restoration.

Expert Advisor in Marine Ecology, Civil Engineering Department, Hong Kong

Advisor to the government of Hong Kong on the adequacy of their current territorial marine environmental monitoring programs; helped them design a comprehensive monitoring program to address environmental issues surrounding disposal of contaminated sediments.

Expert Witness on Impacts of Dredged Material Disposal, US Congressional Hearings

Testified in the U.S. House of Representatives during the summer of 1994 before the subcommittee hearings on the Ocean Dumping Act and Federal Dredging Policy on West Coast dredging issues and alternative technologies for dealing with contaminated sediments and dredged material.

Expert Witness on Impacts of Dredged Material Disposal, US Navy

Provided expert witness testimony for the U.S. Navy in Washington State Water Quality Review Board hearings on the environmental effects of dredged material disposal that led to the granting of a water quality permit for the Navy to proceed with construction of the Everett Homeport facility.

Expert Witness on Impacts of Dredged Material Disposal, US Army Corps of Engineers

Provided expert witness testimony in Federal District Court hearings on the environmental effects of dredged material disposal which led to the re-opening of the WLIS III Dredged Material Disposal Site in Long Island Sound after it had been closed by federal court order following a suit filed by the Town of Huntington.

Environmental Mediation, Ports of Auckland, New Zealand

Facilitated a successful environmental mediation effort in a series of 23 meetings during the summer of 1992 in New Zealand for the Ports of Auckland to address controversy surrounding the designation of an open-water dredged material disposal site.



---

## PUBLICATIONS

- Germano, J.D., D.C. Rhoads, R.M. Valente, L. B. Read, M. Solan, P. Myre, and D. Carey. 2007. The use of Sediment Profile Imaging (SPI) for environmental impact assessments and monitoring studies: Lessons learned from the past four decades. DAMOS Contribution, In Press.
- Germano, J.D. and D.G. Browning. 2006. Marine log transfer facilities and wood waste: When dredging is not your final answer. *IN* Randall, R.E. (ed). Proceedings of the Western Dredging Association Twenty-Sixth Technical Conference. June 25-28, 2006, San Diego, CA. Center for Dredging Studies, College Station, TX.
- Germano, J. D., and Cary, D. 2005. Rates and effects of sedimentation in the context of dredging and dredged material placement, *DOER Technical Notes Collection* (ERDC TN-DOER-E19), U.S. Army Engineer Research and Development Center, Vicksburg, MS.  
<http://el.erd.c.usace.army.mil/dots/doer/doer.html>
- Germano, J.D. 2004. Disposal Site Selection in Maine: The Devil's in the Details. Proceedings of the Western Dredging Association Pacific NW Chapter Conference, Portland, OR. October, 2004.
- Germano, J.D. 2003. Designing borrow pit CAD sites: Remember Newton's Third Law!, pp. 302-312, *IN* Randall, R.E. (ed). Proceedings of the Western Dredging Association Twenty-Third Technical Conference. June 10-13, 2003, Chicago, Illinois. CDS Report No. 376. Center for Dredging Studies, College Station, TX.
- Solan, M., J.D. Germano, D.C. Rhoads, C. Smith, E. Michaud, D. Parry, F. Wenzhöfer, B. Kennedy, C. Henriques, E. Battle, D. Carey, L. Iocco, R. Valente, J. Watson, and R. Rosenberg. 2003. Towards a greater understanding of pattern, scale, and process in marine benthic systems: a picture is worth a thousand worms. *Journal of Experimental Marine Biology and Ecology* 285-286: 313-338.
- Germano, J.D. and L.B. Read. 2002. Natural recovery at a submarine wood waste site, pp 395-402. *IN* Hinchee, R.E., A. Porta, and M. Pelli (eds.). *Remediation and Beneficial Reuse of Contaminated Sediments*. Proceedings of the First International Conference on Remediation of Contaminated Sediments, Venice, Italy, October 10-12, 2001. Battelle Memorial Institute Press. Columbus, OH.
- Germano, J.D., C.A. Reid, P.G.D. Whiteside, and R. Kennish. 2002. Field verification of computer models predicting plume dispersion in Hong Kong. *IN*: S.Garbaciak Jr. (ed). *DREDGING '02. KEY TECHNOLOGIES FOR GLOBAL PROSPERITY*. Proceedings of the third specialty conference on Dredging and Dredged Material Disposal. May 5-8, 2002, Orlando, Florida. SPONSORED BY Coasts, Oceans, Ports, and Rivers Institute (COPRI) of the American Society of Civil Engineers (ASCE). ISBN 0-7844-0680-4
- Chapman, P.M.C., F. Wang, J. Germano, and G. Batley. 2002. Porewater testing and analysis: The good, the bad, and the ugly. *Marine Pollution Bulletin* 44: 359-366.
- Germano, J. D. 2001. Reflections on statistics, ecology, and risk assessment, pp 33-42. *IN*: Aller, Josephine Y., Sarah A. Woodin, and Robert C. Aller (eds.). *Organism-Sediment Interactions*. Belle W. Baruch Library in Marine Science no. 21. University of South Carolina Press, Columbia, SC 29208, USA.

Keegan, B.F., D.C. Rhoads, J.D. Germano, B.O'Connor, D. McGrath, P. Dinneen, F. O'Beirn, M. Solan, R. Kennedy, I. O'Connor, C. Bradley, S. Byrne, A. Grehan, and J. Costelloe. 2001. Sediment profile imagery as a benthic monitoring tool - A "long term" case history evaluation (Galway Bay, West Coast of Ireland), pp 43-62. *IN*: Aller, Josephine Y., Sarah A. Woodin, and Robert C. Aller (eds.). Organism-Sediment Interactions. Belle W. Baruch Library in Marine Science no. 21. University of South Carolina Press, Columbia, SC 29208, USA.

Germano, J.D. 1999. Ecology, statistics, and the art of misdiagnosis: The need for a paradigm shift. *Environmental Reviews* 7(4): 167 - 190.

Rhoads, D.C., R. Valente, J.D. Germano, B. Hilbig, G. Hodgson, and N. Evans. 1995. REMOTS® monitoring of dredging, disposal, sand mining, and organic enrichment on the Hong Kong shelf. pp. 918-924. MTS/OES/IEEE Oceans '95 Conference Proceedings, October 9-12, San Diego, CA.

Germano, J.D. 1994. Environmental mediation and open water disposal. pp. 160-169. *In*: Dredging '94. Proceedings of the Second International Conference on Dredging and Dredged Material Placement. November 13-16, 1994. Orlando, FL. E. Clark McNair, Jr. (ed). Volume 1: Am. Soc. Civil Engineers, New York, NY.

Germano, J. D., D.C. Rhoads and J.D. Lunz. 1994. An integrated, tiered approach to monitoring and management of dredged material disposal sites in the New England regions. DAMOS Contribution #87. Report to US Army Corps of Engineers, New England Division, Waltham, MA.

Fredette, T.J., P.G. Kullberg, D.A. Carey, R.W. Morton, and J.D. Germano. 1992. Twenty-five years of dredged material disposal site monitoring in Long Island Sound: A long-term perspective. Proceedings of the Long Island Research Conference, October 23-24, 1992. New Haven, CT.

Fredette, T.J., J.D. Germano, D.A. Carey, P. Murray, and P. Kullberg. 1992. Chemical stability of capped dredged material disposal mounds in Long Island Sound, USA. *Chem. Ecol.* 7:173-194.

Valente, R.M., D.C. Rhoads, J.D. Germano, and V.J. Cabelli. 1992. Mapping of benthic enrichment patterns in Narragansett Bay, RI. *Estuaries*. 15:1-17.

Sumeri, A., T.J. Fredette, P.G. Kullberg, J.D. Germano, D. A. Carey, and P. Pechko. 1991. Sediment chemistry profiles of capped *in-situ* and dredged sediment deposits: Results from three U.S. Army Corps of Engineers offices. pp. 161-187. *In*: Proceedings of the Twenty-Fourth Annual Dredging Seminar. May 15, 1991. J.B. Herbich (ed). Center for Dredging Studies Report No. 321.

Germano, J.D. 1991. To grab or not two grabs: Infaunal benthic sampling strategies and the need for replication. A discussion of statistical power analysis. White paper submitted to EPA Region IX under Contract 68-C8-0061.

Rhoads, D.C. and J.D. Germano. 1990. The use of REMOTS® imaging technology for disposal site selection and monitoring. pp. 50-64. *In*: Geotechnical Engineering of Ocean Waste Disposal, K. Demars and R. Chaney (eds). ASTM Symposium Volume, January, 1989. Orlando, FL.

Germano, J.D., D.C. Rhoads, L.F. Boyer, C.A. Menzie, and J.A. Ryther, Jr. 1989. REMOTS® imaging and side-scan sonar: Efficient tools for mapping sea floor topography, sediment type, bedforms, and biology. pp. 39-48. *In*: Oceanic Processes in Marine Pollution. Volume 4: Scientific Monitoring

- Strategies for Ocean Waste Disposal. D.W. Hood, A. Schoener, and P.K. Park (eds). R.E. Krieger Publishing Co., Malabar, FL.
- Revelas, E.C., J.D. Germano, and D.C. Rhoads. 1987. REMOTS®: Reconnaissance of benthic environments. pp. 2069-2083. Coastal Zone '87, ASCE, May 26-29, Seattle, WA.
- Rhoads, D.C. and J.D. Germano. 1986. Interpreting long-term changes in benthic community structure: A new protocol. *Hydrobiologia*. 142:291-308.
- Germano, J.D. 1985. An evaluation of Gray's Log-Normal method. White paper prepared for U.S. Army Corps of Engineers, Waterways Experiment Station. Marine Surveys, Inc. Report No. MS3-198517.
- Germano, J.D., and D.C. Rhoads. 1984. REMOTS® sediment profiling at the Field Verification Program (FVP) disposal site. pp. 536-544. In: *Dredging and Dredged Material Disposal*. R.L. Montgomery and J.W. Leach (eds). Volume 1. Am. Soc. Civil Engineers. New York, NY.
- Germano, J.D. 1983. High resolution sediment profiling with REMOTS® camera system. *Sea Technol.* 24:35-41.
- Germano, J.D. 1983. Infaunal succession in Long Island Sound: Animal-sediment interactions and the effects of predation. Ph.D. dissertation, Yale University, New Haven, CT.
- Rhoads, D.C. and J.D. Germano. 1982. Characterization of organism-sediment relations using sediment profile imaging: An efficient method of Remote Ecological Monitoring of The Seafloor (REMOTS® System). *Mar. Ecol. Prog. Ser.* 8:115-128.

### Education

B.A. Earth & Environmental Science,  
Wesleyan University, 1985

Graduate Study, Marine Geology &  
Geophysics, University of Rhode  
Island, 1987-1988

### Areas of Specialization

Sediment Profile Imaging  
Marine Environmental Sampling  
Marine Geology & Geophysics  
Side Scan Sonar & Hydrographic  
Survey Techniques  
Viticulture & Enology

### Employment History

*2001 - present* - Senior Scientist,  
Germano & Associates, Inc.,  
Olympia, WA office

*2000 - present:* Browning  
Environmental, Olympia, WA

*1995 - 2000:* Scientist, Striplin  
Environmental Associates,  
Olympia, WA

*1988 - 1995:* Scientist, Science  
Applications International  
Corporation, Bothell, WA

*1985 - 1988:* Research Assistant,  
Graduate School of  
Oceanography, University of  
Rhode Island, Kingston, RI

### Experience Summary

Mr. Browning has more than 18 years of experience in the collection, analysis and interpretation of marine environmental and geophysical data supporting monitoring and engineering studies. Mr. Browning is an expert in the use of sediment-profile imaging (SPI) for mapping dredged material deposits, physical benthic habitats and physical processes/disturbances. He has led, managed or supported dozens of SPI surveys throughout the West Coast, Alaska, and Asia and has analyzed and interpreted thousands of SPI images from diverse benthic environments. David has presented several papers on the use of SPI for assessing benthic habitats and physical processes affecting the marine seafloor. From 1991 to 1995, David managed west coast SPI operations for SAIC and implemented Striplin's SPI program from 1995 to 2000.

In addition to SPI, Mr. Browning has served as principal investigator on numerous projects investigating sediment quality, water quality and habitat quality issues in support of dredging, capping and environmental clean-up projects. He is well versed in the methods of sediment acquisition ranging from hollow-stem augering to boxcoring along with the sediment analyses and interpretive criteria required for different regulatory programs throughout the country. Mr. Browning has also led or participated in several biological sampling projects and is highly experienced in biological collection ranging from benthic infauna to crabs and finfish.

---

### WORK EXPERIENCE

#### • *Environmental Assessment*

##### Confined Aquatic Disposal Monitoring, Sinclair Inlet, Puget Sound

During the summer of 2002, Mr. Browning performed a sediment profile imaging survey of the confined aquatic disposal borrow pit adjacent to the Puget Sound Naval Shipyard in Bremerton, WA. The survey was performed for the US EPA to investigate the cause of elevated contaminant concentrations found in sediment samples from the nearby seafloor taken after capping operations were completed. The SPI survey showed that the dredged material apron extended over 200 meters beyond the designated CAD pit boundary.

##### Post-Drilling EIA Monitoring, Caspian Sea

In September 2002, Mr. Browning participated in a comprehensive mapping survey to delineate the footprint of drilling muds/cuttings surrounding three former oil well sites in the Caspian Sea off the coast of Azerbaijan. The sediment profile imaging survey documented the lateral

extent of drilling muds on the seafloor in depths from 70 – 500 meters; SPI technology was used at all three sites to map the footprint of the muds. The film was developed immediately on-board following completion of the reconnaissance SPI survey, and the results were used to plan the location of the grab samples taken for sediment chemical and biological analyses.

#### Wood Waste Investigations, Puget Sound

Mr. Browning assisted in data collection and analyzed all images in SPI surveys at Port Gamble and in the Hylebos waterway for industrial clients to both characterize the extent of wood waste at former log rafting/transfer sites and assess the status of benthic recovery in these areas. The results from the SPI surveys were used to delineate the extent of wood waste impacts and provide a rapid characterization of the status of the benthic community.

#### Thorne Bay Bark and Benthic Assessment

Mr. Browning assisted in data collection and analyzed all images for the benthic and sediment profile imaging survey at a former log transfer facility in Thorne Bay, Alaska. As a subcontractor to Tetra Tech for TMDL support to the Alaska Department of Environmental Conservation, Germano & Associates performed all water and sediment sampling in addition to sediment profile and plan-view imaging in June, 2005, to assess the nature and extent of impacts associated with wood waste on the seafloor.

#### Evaluation of Sediment and Benthos Characteristics at a Proposed LNG Deep Water Port

Mr. Browning assisted in data collection and analyzed all images for a comprehensive sediment profile imaging survey as part of a permit application baseline study for a proposed pipeline route and deepwater port associated with an LNG offloading terminal for a facility on the east coast of the United States. A total of 160 stations were surveyed in July 2005 in a range of water depths between 200-300 feet, and a complete report and interpretation of all profile images was submitted to the client within 30 days following completion of the field survey.

#### Habitat Restoration Project, Woodard Bay, Puget Sound

Mr. Browning assisted in data collection and analyzed all images for a combination SPI/plan-view survey of a former log storage area in Puget Sound that was scheduled to undergo a restoration for oyster habitat by the Nature Conservancy. The proposed area was surveyed in one day of field work, and the results of the SPI and plan-view camera analysis to determine whether or not the proposed area was suitable for oyster habitat were submitted to the client within 2 weeks of completion of the field work.

#### Wyckoff 2002 Operations Maintenance and Monitoring Plan (OMMP), Eagle Harbor, WA

Mr. Browning provided input to the Corps of Engineers, Seattle District regarding chemical and biological monitoring of the Wyckoff/Eagle Harbor East Harbor operable unit. The OMMP Addendum was developed by the Seattle district and input/recommendations were provided to match biological and chemical monitoring (surface and subsurface sediments) to project goals and regulatory requirements.

#### Capping Demonstration Project, Los Angeles Harbor

As part of a comprehensive capping demonstration project in Los Angeles Harbor being carried out for the US Army Corps of Engineers, Los Angeles District in coordination with the Contaminated Sediments Task Force, Mr. Browning participated in the post-capping monitoring surveys using Sediment Profile Imaging technology in the fall of 2001. Approximately 40 stations were monitored in this time-series to study the effectiveness and impacts of confined aquatic disposal as a management tool for contaminated sediments.

**Sediment Profile Imaging Survey, Lower Willamette River**

As part of a multi-disciplinary RI/FS investigation of the Lower Willamette River, Mr. Browning analyzed and helped collect the sediment profile images for a baseline characterization of the lower 15.7 miles of the river using sediment profile imaging technology. The report produced from this study was a required deliverable under the Stipulated Agreement for Portland Harbor which was incorporated by reference into the Administrative Order on Consent for the Portland Harbor CERCLA Site. The SPI results provided reconnaissance information on the physical and biological features of surface sediments in the Willamette River from Ross Island to the Columbia River. A total of 514 stations were sampled between November 26 and December 10, 2001.

**PSDDA Disposal Site Monitoring**

Mr. Browning participated in all SPI monitoring and analyzed the images from the Commencement Bay and Elliott Bay Disposal Sites in 2001 and 2002. Between 50-70 sediment profile imaging stations were sampled at each site, with maps of the dredged material footprint submitted to the client within 24 hours of the field sampling; a comprehensive report on the profile imaging results was submitted within 4 weeks of completion of the field work at each site. Mr. Browning also provided sediment and biological sampling expertise during the 2002, 2001, 1995, 1992 and 1990 monitoring events.

**Comprehensive Environmental Impact Baseline Survey, People's Republic of China**

Mr. Browning participated in a comprehensive SPI survey in the fall of 2001 as part of a multi-disciplinary environmental impact study for an industrial client in the People's Republic of China. A baseline characterization of an entire bay over 650 km<sup>2</sup> in area was surveyed using Sediment Profile Imaging as a requirement for building a large industrial coastal facility. Field work was completed within one week, and Mr. Browning analyzed all images within 2 weeks of completion of all field activities.

**RCRA Investigation, Soda Lake, WY**

Mr. Browning served as task manager for sediment studies for a RCRA facilities investigation of Soda Lake, Wyoming. He collected, analyzed, and reported SPI and water column profile data and provided extensive support for surface sediment sampling, sediment coring and biological collections within the lake. Responsible for reporting sediment quality results in final documents and provided input in developing a conceptual model of the physical and biological dynamics of the lake that was utilized in the Risk Assessment.

**SPAWARS PRISM Project: Field Verification of Bioturbation Depths**

The Navy is in the process of identifying, assessing, and remediating a large number of coastal facilities with contaminated sediments; as part of this effort, the PRISM project is developing a set of diagnostic tools for characterizing and quantifying in-place contaminant pathways to aid in the effective selection, permitting and monitoring of *in-situ* sediment management strategies. Mr. Browning participated in all sediment profile imaging surveys and performed all image analysis as part of this multidisciplinary, comprehensive program development carried out in San Diego Harbor, CA and Pearl Harbor, Hawaii in 2001-2002.

**Ecological Impacts of Potential New Jersey Sand Mining Operations, Minerals Management Service**

Mr. Browning performed all image analysis and field collection for the Sediment Profile Imaging (SPI) surveys in 2001 that were done as part of baseline ecological assessment of potential sand resource mining areas off the coast of New Jersey.

**Post-Disposal Monitoring, Coos Bay, OR**

Mr. Browning performed a SPI and plan-view video study to map the extent of a newly placed dredged material deposit (<8 hours after disposal) at three disposal sites at the mouth of Coos Bay, WA. Plan-view video was affixed to SPI frame and the sampling grid was adjusted real-time using real-time information provided by the video. 1999 – 2000.

---

**Wyckoff Superfund Site Monitoring, Eagle Harbor, WA**

In 1999-2000, Mr. Browning was Project Manager and principal investigator for Year 5 monitoring of the sediment cap placed at the Wyckoff/Eagle Harbor Superfund Site. Year 5 monitoring included SPI, towed video, sediment core sampling, and surface sediment sampling for benthos and sediment chemistry. In 1994-1995, Mr. Browning was Project Manager for the development of a 10-year monitoring plan to determine the efficacy of the sediment cap placed at the Wyckoff/Eagle Harbor Superfund Site. The plan was prepared under both CERCLA and COE guidance. Elements of long-term monitoring included: bathymetry, subbottom sonar profiling, SPI, towed video, and sediment sampling. After the monitoring plan was accepted, Mr. Browning was also the Principal Investigator for all physical monitoring during the cap construction at the creosote-contaminated Wyckoff/Eagle Harbor Superfund Site, East Harbor Operable Unit. Physical monitoring included pre-, syn-, and post-placement bathymetry, sediment profile imaging, water quality monitoring, towed underwater video, gravity coring and subbottom sonar profiling.

**SPI Survey, Red Dog Mine, AK**

In 1998, Mr. Browning was the Project Manager for an SPI survey of proposed dredged material disposal sites in support of Port Facility Expansion at Cominco's Red Dog Mine, Alaska. The SPI survey provided information the benthic resources at the site, aided in the interpretation of benthic infaunal community analysis and served as a pre-dredging and disposal baseline.

**Wood Waste Evaluation, Tacoma, WA**

In 1998-1999, Mr. Browning evaluated wood waste issues in the Hylebos Waterway, Tacoma, WA by looking at potential toxicity of wood-derived chemicals and estimating the volume percentages of wood waste in areas to be remediated using sediment profile images. SPI wood waste data were ground-truthed to true wood waste volumes and conventional chemistry parameters (e.g. total volatile solids). Estimated percent cover of wood waste throughout the Hylebos using plan-view affixed to the SPI camera frame.

**Sediment Characterization and Deposit Study, Fox River, WI**

Mr. Browning was responsible for the physical demarcation of sediment deposits in the stretch of the Fox River extending from Little Lake Butte de Morts to DePere. Sediment deposits were identified and measured for lateral extent and thickness using subbottom profiling sonar, dual frequency hydrographic surveying and poling. The data were synthesized and processed to produce isopach maps of deposit thickness. These data were then used to determine the locations of sediment collection to best characterize the deposit in terms of chemical burdens.

**Confined Aquatic Disposal Monitoring, US Army Corps of Engineers, Los Angeles District**

In 1994 – 1995, Mr. Browning conducted SPI surveys prior to and immediately after the placement of 800,000 CY of contaminated dredged material in a confined aquatic disposal site immediately inside the San Pedro breakwater. Mapped the distribution of construction-related sediments, contaminated sediments, and pertinent physical and biological features at the study area.

**Wood Waste Evaluation, Lake Washington, WA**

In 1996-1997, Mr. Browning conducted a sediment profile imaging survey of a wood waste and coal tar contaminated site in Lake Washington. Analyzed all SPI images and developed wood waste volume estimation method for SPI images.

**Sediment Characterization Investigation, Bellingham, WA**

In 1996-1997, Mr. Browning assisted in the collection of sediment samples (vibracore) and compositing of 4 to 16 ft sediment cores for a PSDDA pre-dredge sediment characterization for the Port of Bellingham and U.S. Oil.

**Bay Farm Borrow Area (BFBA) Investigations, US Army Corps of Engineers, San Francisco District**

Between 1991-1994, Mr. Browning was the task manager for a multi-disciplinary environmental survey for U.S. Army Corps of Engineers to determine the suitability of the BFBA as an open water dredged material disposal site pursuant to Section 404 of the Clean Water Act. He was responsible for the coordination and conductance of all sampling surveys and reporting activities. Elements of the seasonal BFBA surveys included precision navigation, sediment profile imaging to determine benthic conditions, collection of sediments for conventional and contaminant chemicals analyses to determine nature and extent of substrate chemical properties, collection of infauna to assess the benthic community structure, in-situ profiling of the water column to determine seasonal temperature, salinity and dissolved oxygen conditions, characterization of epibenthic, demersal and pelagic faunal populations using gill-nets and otter trawls, measurement of near-bottom tidal currents and passing wave trains, and observations of avian and mammalian fauna throughout the surveys.

**Hong Kong Coastal REMOTS® Survey**

Between 1996-1997, Mr. Browning participated in a series of Sediment Profile Imaging (SPI) surveys of Hong Kong coastal waters for the Geotechnical Engineering Office (GEO) of the Hong Kong Government's Civil Engineering Department. Mr. Browning evaluated SPI images for the presence of dredged material as well as other biological and geological features.

**Biological Monitoring, Grays Harbor, WA**

Mr. Browning participated in the collection, identification and enumeration of crabs and fishes in Grays Harbor and Willapa Bay, WA during 1994-1996. He was responsible for preparation of all weekly and synthesis data reports.

**PUBLICATIONS/REPORTS**

- Germano, J.G., and D.G. Browning. 2006. Marine Log Transfer Facilities and Wood Waste: When Dredging Is Not Your Final Answer. In prep. Proceedings of the Pacific Chapter of the Western Dredging Association, San Diego, CA. June 2006.
- Browning, D.G., and E.C. Revelas. 2004. A SPI-based technique for determining wood waste volumes and effects in marine sediments. Presentation at the SPICE (*Sediment Profile Imaging Colloquium of Experts*) Conference, University of Galway, March 4-5, 2004. Galway, Ireland.
- Browning, D.G., E.C. Revelas, R.A. Hollar, and A. Risko. 1996. Confined Disposal and Capping of Dredged Material in the Long Beach Borrow Area. Abstract. Proceedings of the Pacific Chapter of the Western Dredging Association, Honolulu, HI. Nov. 1996.
- Browning, D.G. and E.C. Revelas. 1996. Development and Application of the Physical Disturbance Index (PDI) for Sediment Profile Images. Abstract. PERS, Pacific Northwest Chapter Proceedings, Olympia, WA.
- Browning, D., P. Cagney and E. Nelson. 1995. Physical Monitoring of Subtidal Cap Construction at the Wyckoff/Eagle Harbor Superfund Site. Puget Sound Research 1995 Proceedings.
- Browning D., D.A. Kendall and E.C. Revelas. 1993. Delineation and Biogenic Reworking of a Dredged Material Deposit Placed at a Deep Water Disposal Site. Abstract. Proc. PNWCSETAC Proceedings May 1993.
- Sichel, S.A., D. Browning and H. Sigurdsson. 1988. Pseudopicrotic MORBs from the Southern Mid-Atlantic Ridge. American Geophysical Union. EOS Transaction. Abs.
- Sigurdsson H., J. Palais and D. Browning. 1986. Petrologic Evidence of Volcanic Degassing,



Proceedings of the Norman D. Watkins Symposium on the Environmental Impact of Volcanism. University of Rhode Island, Graduate School of Oceanography, 1986.

Browning D. 1985. The Petrology of a Suite of Mafic and Ultramafic Nodules from the Pinacate Volcanic Field, Sonora, Mexico. Honors Thesis, Wesleyan University, Middletown, Ct. 76 pp.

### Education

M.S., Marine Science, Marine Sciences  
Research Center, Stony Brook University,  
NY, 1985

B.A., Environmental Science, University  
of North Carolina at Wilmington, NC, 1981

### Areas of Specialization

Marine environmental monitoring and  
impact assessment

Benthic ecology and sediment quality  
investigations

Sediment Profile Imaging

Dredged material characterization,  
monitoring and management

Contaminated Sediment Management  
QA/QC of environmental monitoring

### Professional Memberships

Estuarine Research Federation  
Southeast Estuarine Research Society  
Society of Environmental Toxicology and  
Chemistry (SETAC)

### Employment History

*2003-present – Senior Scientist,*  
Germano & Associates, Bellevue,  
WA

*2003-present – President, RMV*  
Environmental, St. Marys, GA

*1996 - 2003: Senior Marine Scientist and*  
*Project Manager, Science*  
*Applications International*  
*Corporation (SAIC), Newport, RI*

*1994 - 1996: Senior Scientist, Science*  
*Applications International*  
*Corporation, Hong Kong*

*1990 - 1994: Quality Assurance*  
*Specialist, Science Applications*  
*International Corporation,*  
*Narragansett, RI*

*1986 - 90: Staff Scientist, Science*  
*Applications International*  
*Corporation, Newport, RI*

### Experience Summary

Ray Valente is a senior marine scientist and project manager with over eighteen years of experience in marine environmental monitoring and impact assessment. He has successfully led hundreds of investigations involving biological and chemical sampling to characterize marine and estuarine benthic habitats and to monitor the environmental impacts of dredging and dredged material disposal.

Under contracts with the US Army Corps of Engineers and US Environmental Protection Agency, Mr. Valente has managed interdisciplinary marine ecological and oceanographic monitoring investigations at dredged material disposal and contaminated sediment capping sites on the U.S. East and West Coasts. He also managed a project during 2002-3 to prepare a series of publication-quality scientific papers and a website on the topic of benthic habitat mapping, under a contract with the NOAA Coastal Services Center in Charleston, SC. On an International Assignment in Hong Kong from 1994 to 1996, Mr. Valente conducted several major benthic ecological and sediment contaminant monitoring studies for the Civil Engineering Department's Dredged Material Management Program. Prior to 1994, he was a key participant in the design and implementation of the EPA's Environmental Monitoring and Assessment Program (EMAP-Estuaries).

Mr. Valente is a leading expert in the seafloor mapping technique known as Sediment-Profile Imaging (SPI), having collected and analyzed thousands of images from diverse benthic habitats in the U.S. and overseas. He has authored hundreds of technical reports and scientific papers and possesses specific expertise in benthic ecology, benthic habitat mapping, organism-sediment relationships, characterization of sediment quality, dredged material monitoring and management, development of quality assurance/quality control (QA/QC) programs for marine environmental monitoring, and the statistical design and analysis of chemical and biological sampling programs.

### WORK EXPERIENCE

**Disposal Area Monitoring System (DAMOS) Program.** For over 17 years, Mr. Valente has been a key contributor to this long-running program sponsored by the Corps of Engineers New England District, involving intensive environmental monitoring at 11 open water dredged material disposal sites. As Deputy Program Manager from 1999 to 2003, Mr. Valente was responsible for supervision of a staff of 3 to 5 junior scientists, planning and implementation of interdisciplinary monitoring studies, data analysis, reporting, and QA/QC oversight.

**Long-term Monitoring of Sand Capping Projects in the New York Bight:** Under multiple contracts with the Corps of Engineers-New York District, Mr. Valente has led multidisciplinary environmental monitoring studies to: 1) evaluate the long-term stability of sand caps used for isolating dioxin-contaminated sediments at the former Mud Dump Site (MDS), and 2) assess the efficacy of on-going capping operations over the 9-sq.mile Historic Area Remediation Site (HARS). During the summer of 2002, Mr. Valente was Project Manager for a series of monitoring studies valued at more than \$600K. A suite of sampling techniques (bathymetry, side-scan sonar, sub-bottom profiling, SPI and sediment planview photography, benthic community analysis, sediment toxicity testing, vibra-coring) were used to evaluate cap material thickness, spatial distribution, and benthic recolonization status.

**In-Situ Capping of Contaminated Sediments on the Palos Verdes Shelf: Summer 2000 Demonstration Project:** Mr. Valente was a Principal Investigator on this EPA Region 9-sponsored project (>\$1.5M value) to evaluate the feasibility of using sand to cap DDT-contaminated sediments on the PV Shelf. He was responsible for developing the Project Work Plan (including Field Sampling Plan, DQO and QAPP sections), planning and implementation of the Sediment Profile Imaging (SPI) and Benthic Community monitoring components, and interpreting/reporting of results.

**Benthic Habitat Mapping Project, NOAA Coastal Services Center (CSC):** As Project Manager during 2002-3, Mr. Valente was responsible for overseeing the preparation of six publication-quality manuscripts dealing with various aspects of estuarine benthic habitat mapping; these papers are being translated into a series of short articles that will be incorporated into an official CSC website designed to educate coastal managers on this topic. Mr. Valente developed the outline for each scientific paper, authored one of the papers, acted as technical editor for the other five papers, supervised the activities of university subcontractors responsible for short article preparation, interacted frequently with CSC personnel, and maintained overall fiscal and technical responsibility for the project.

**Sediment-Profile Imaging Surveys:** Mr. Valente has been responsible for planning, managing and/or participating in numerous sediment-profile imaging surveys to characterize physical and biological seafloor conditions and assess overall benthic habitat quality in a wide variety of inshore, estuarine and near-coastal environments. Projects have included baseline characterizations of benthic habitats at potential dredged material disposal sites in Rhode Island Sound (under subcontracts to ENSR and Battelle over the period 1996 to 2002), a series of surveys conducted over the period 1999 to 2003 to evaluate the potential effects of degraded benthic habitat quality and sediment anoxia in western Long Island Sound as potential causative agents in the massive 1999 lobster die-off (contracts with EPA, NY DEC and CT DEP), surveys to map benthic habitats in the Hudson River (under a 2001 subcontract to MSRC at Stony Brook University), and surveys to examine the effects of bottom trawling on soft-bottom habitats in Massachusetts Bay (2002-3 NOAA study conducted under subcontract to CR Environmental).

**Dredged Material Management Program (DMMP), State of Massachusetts:** Under a subcontract with the Maguire Group, Inc., Mr. Valente was responsible for leading SAIC's efforts over the period 1998 to 2003 to support the Massachusetts Coastal Zone Management Agency (MCZM) in their efforts to develop a state-wide DMMP. Efforts were focused on screening potential aquatic disposal sites in various harbors (e.g., Salem, Gloucester, New Bedford), conducting a suite of baseline field surveys at candidate open-water sites in Buzzards Bay, and preparation of a draft Environmental Impact Statement for state designation of a new Buzzards Bay dredged material disposal site.

**Hong Kong Sediment-Profile Imaging Surveys:** Over the period 1994 to 1996, Mr. Valente planned and successfully executed six major surveys of benthic habitat quality in Hong Kong territorial waters, involving

traditional grab sampling and sediment-profile imaging. He was responsible for statistical sampling design, management of field work, statistical assessment of results, and report writing. The results were used to map bottom features and assess the impact of anthropogenic stressors on Hong Kong's benthic marine environment.

**East Sha Chau Contaminated Mud Pit Monitoring and Assessment, Hong Kong:** From 1994 to 1996, Mr. Valente served as Principal Investigator for sampling and assessment of sediment contamination as part of a multidisciplinary monitoring program to determine the ecological impacts of contaminated mud disposal and capping in a shallow-water estuary. He was responsible for developing sampling and QA/QC protocols, overseeing the collection and laboratory analysis of sediment chemistry samples, interpretation and reporting of results.

**Seabed Kill Investigation in Mirs Bay, Hong Kong:** Mr. Valente was Principal Investigator for a rapid response field survey to investigate the ecological effects of hypoxic water intrusion in Mirs Bay, Hong Kong during the summer 1994. He was responsible for conducting sediment-profile imaging, water quality sampling, data analysis, and reporting.

**US Environmental Protection Agency's Environmental Monitoring and Assessment Program (EMAP):** Over the period 1990 to 1994, Mr. Valente was a key participant in the design and implementation of the U.S. EPA's Environmental Monitoring and Assessment Program (EMAP-Estuaries), a large-scale marine environmental monitoring effort involving extensive biological and chemical sampling in estuaries throughout the United States. As Quality Assurance Manager for EMAP-Estuaries, he was responsible for developing and documenting field sampling protocols and laboratory methods, writing the Quality Assurance Project Plan, and managing a comprehensive QA/QC Program. Mr. Valente was actively involved in assessment and reporting activities, particularly in the interpretation of sediment contaminant and toxicity test results in relation to benthic community condition.

**U.S. Army Corps of Engineers DAMOS Program:** From 1986 to 1990, Mr. Valente served as an SAIC Staff Scientist and Deputy Program Manager on the US Army Corp of Engineers Disposal Area Monitoring System (DAMOS) program, involving planning, execution and reporting of multidisciplinary environmental monitoring studies at dredged material disposal sites along the US East and Gulf Coasts. Specific duties included water and sediment sampling in a variety of aquatic environments, participation in precision bathymetric and sidescan sonar surveys, conducting sediment-profile imaging surveys, technical and statistical interpretation of study results, and preparation of reports, scientific journal articles and technical presentations at scientific meetings.

**Various Sediment-Profile Imaging Surveys in U.S. and Overseas:** Over the period 1986 to 1990, Mr. Valente performed a series of studies involving sediment-profile imaging, including synoptic monitoring of estuarine eutrophication gradients in Narragansett Bay, RI, bottom characterization studies for sewage outfall siting in Boston Harbor, MA, and studies to determine the effects of aquaculture operations on bottom sediments in Galway Bay, Ireland.

## **PUBLICATIONS**

Solan, M., J.D. Germano, D.C. Rhoads, C. Smith, E. Michaud, D. Parry, F. Wenzhöfer, B. Kennedy, C. Henriques, E. Battle, D. Carey, L. Iocco, R. Valente, J. Watson, and R. Rosenberg. 2003. Towards a

greater understanding of pattern, scale, and process in marine benthic systems: a picture is worth a thousand worms. *Journal of Experimental Marine Biology and Ecology* 285-286: 313-338.

Valente, R.M. and T. Fredette. 2002. Benthic recolonization of a capped dredged material mound at an open water disposal site in Long Island Sound. *Proceedings of Dredging '02: Third Specialty Conference on Dredging and Dredged Material Disposal*, May 5-8, Orlando, Florida. American Society of Civil Engineers, Reston, VA.

Paul, J. F., K. J. Scott, D. E. Campbell, J. H. Gentile, C. S. Strobel, R. M. Valente, S. B. Weisberg, A. F. Holland, and J. A. Ranasinghe. 2001. Developing and applying a benthic index of estuarine condition for the Virginian Biogeographic Province. *Ecological Indicators* 1: 83-99.

Valente, R. M., T. Waddington, J. Infantino, and G. Tufts. 2001. Palos Verdes Shelf Pilot Capping: Use of Side-Scan Sonar, Sediment-Profile Imaging and Planview Photography for Resolving Cap Material Distribution and Thickness. pp. 381-396 In: R. Randall [Ed.], *Proceedings of the Western Dredging Association Twenty-first Technical Conference*, Houston, TX. Center for Dredging Studies, Civil Engineering Department, Texas A&M University, College Station, TX (CDS Report No. 373).

Valente, R. M., S. M. McChesney and G. Hodgson. 2000. Benthic recolonization following cessation of dredged material disposal in Mirs Bay, Hong Kong. *Journal of Marine Environmental Engineering* 5: 257-288.

Johnston, R. K. and R. M. Valente. 2000. Specifying and Evaluating Quality Requirements for Analytical Chemistry. Technical Memorandum 99-01, Marine Environmental Support Office, Space and Naval Warfare Systems Center, San Diego, CA, 32 pp.

Valente, R. M., S. E. McDowell and B. May. 1998. Monitoring of the 1997 Category II Capping Project at the New York Mud Dump Site. *Proceedings of the 15th World Dredging Conference (WODCON)*, June 28 - July 2, 1998, Las Vegas, NV. World Organization of Dredging Associations.

Valente, R. M., H. Hung, S. McChesney and G. Hodgson. 1998. An investigation of benthic recolonization at a backfilled marine borrow pit in Hong Kong. In: B. Morton [Ed.], *Proceedings of the Third International Conference on the Marine Biology of the South China Sea*. Hong Kong, 28 October – 1 November 1996. Hong Kong University Press.

Valente, R. M., D. C. Rhoads, J. D. Germano and V. J. Cabelli. 1992. Mapping of benthic enrichment patterns in Narragansett Bay, RI. *Estuaries* 15:1-17.

Parker, J. P. and R. M. Valente. 1988. Long-term sand cap stability: New York dredged material disposal site. Contract Report CERC-88-2, US Army Engineer District, New York.

Valente, R. M., E. M. Cosper and C. F. Wurster. 1987. Interactive effects of copper and silicic acid on resting spore formation and viability in a marine diatom. *J. Phycol.* 23: 156-163.

## PRESENTATIONS

Valente, R.M. 2003. Benthic colonization of red clay dredged material in the New York Bight. New England Estuarine Research Society Spring Meeting, May 8-10, Fairhaven, Massachusetts.

Valente, R.M. and T. Fredette. 2002. Benthic recolonization of a capped dredged material mound at an open water disposal site in Long Island Sound. *Dredging '02: Third Specialty Conference on*

Dredging and Dredged Material Disposal, May 5-8, Orlando, Florida.

- Valente, R.M. and C. Cuomo. 2002. Sediment anoxia and bottom water ammonia and sulphide as potential factors in lobster mortality in Long Island Sound, USA. Benthic Dynamics Conference: In-situ surveillance of the sediment-water interface. University of Aberdeen, Scotland, March 25-29, 2002.
- Valente, R. M., T. Waddington, J. Infantino, and G. Tufts. 2001. Palos Verdes Shelf Pilot Capping: Use of Side-Scan Sonar, Sediment-Profile Imaging and Planview Photography for Resolving Cap Material Distribution and Thickness. Western Dredging Association Twenty-first Technical Conference, June 24-27, 2001, Houston, TX.
- Valente, R. M. 2000. Use of seafloor visualization tools for dredged material monitoring and management. Conference on Dredged Material Management: Options and Environmental Considerations, Massachusetts Institute of Technology, December 3-6, 2000, Cambridge, MA.
- Valente, R. M. 1999. Evaluation of candidate dredged material disposal sites in Narragansett Bay and Rhode Island Sound using REMOTS® sediment-profile imaging. 34<sup>th</sup> Annual Meeting of the Geological Society of America (Northeast Section), March 22-24, 1999, Providence, RI.
- Valente, R. M. and E. C. DeAngelo. 1998. Remote Ecological Monitoring of the Seafloor (REMOTS® System): Selected Sediment Profile Images from the New York Mud Dump Site. Organism-Sediment Interactions Symposium, October 1998, Belle Baruch Marine Science Center, Georgetown, SC.
- Valente, R. M. 1997. Benthic recolonization following cessation of dredged material disposal in Mirs Bay, Hong Kong. Biennial International Estuarine Research Federation Conference (ERF '97), October 1997, Providence, RI.
- Valente, R. M., D. C. Rhoads, J. D. Germano, V. J. Cabelli, Y. Krieger and S. Muslow. 1992. Benthic habitats as long-term time integrators of organic enrichment in Narragansett Bay. 20th Annual Marine Benthic Ecology Meeting, Newport, Rhode Island, March 26-29.
- Valente, R. M. 1991. Quality assurance of field dissolved oxygen measurements on the EMAP-Estuaries program. Society of Environmental Toxicology and Chemistry 12<sup>th</sup> Annual Meeting, Seattle, Washington, Nov. 3-7.
- Valente, R. M. 1991. An overview of the EMAP-Estuaries quality assurance program. NOAA National Status and Trends Program Annual Meeting, Beaufort, North Carolina, Dec. 10-12.
- Rhoads, D. C., R. M. Valente, and J. D. Germano. 1989. REMOTS® mapping of benthic enrichment gradients in Narragansett Bay, RI. Tenth Biennial International Estuarine Research Conference, Baltimore, Maryland, Oct. 8-12.
- Valente, R. M. 1988. Disposal site monitoring using REMOTS® sediment-profile photography in combination with precision bathymetry. Fifth DAMOS Symposium, Cambridge, Massachusetts, Dec. 7.

#### **SELECTED TECHNICAL REPORTS**

- Valente, R. M. and C. Cuomo. 2001. Investigations into the Cause of American Lobster Mortality in Long Island Sound, Volume I: REMOTS® Sediment-Profile Imaging and Water Quality Monitoring from August to December 2000. Prepared for New England Interstate Water Pollution Control Commission and U.S. Environmental Protection Agency, Long Island Sound Program Office, Stamford, CT.
- Valente, R. M. 2001. November 2000 Baseline Characterization of Benthic Macroinvertebrate Communities at Two Candidate Dredged Material Disposal Sites in Buzzards Bay, MA. SAIC Report No. 550 prepared for Massachusetts Coastal Zone Management Agency, Boston, MA.
- Valente, R. M. and G. Tufts. 2001. November 2000 REMOTS® Sediment-Profile Imaging Survey at Two Candidate Dredged Material Disposal Sites in Buzzards Bay, MA. SAIC Report No. 548 prepared for Massachusetts Coastal Zone Management Agency, Boston, MA.
- Valente, R. M. and G. Tufts. 2001. November 2000 Baseline Characterization of Sediment Chemistry at Two Candidate Dredged Material Disposal Sites in Buzzards Bay, MA. SAIC Report No. 536 prepared for Massachusetts Coastal Zone Management Agency, Boston, MA.
- McDowell, S., C. Phillips, R. M. Valente, and others. 2000. Project Work Plans for the Palos Verdes Pilot Capping Monitoring Program: Baseline, Interim and Post-cap Monitoring Phases. Submitted to U.S. Army Corps of Engineers Los Angeles District and Region 9 of U.S. EPA.
- Valente, R. M. 1999. Study and Analysis of Potential In-Water Dredged Material Disposal Sites in Narragansett Bay, RI. SAIC Report No. 473 prepared for Rhode Island Coastal Zone Management Council, Providence, RI.
- Valente, R.M. and E. DeAngelo. 1999. The 1997 Category II Capping Project at the New York Mud Dump Site: Results from the One-Year Postcap Bathymetry and REMOTS® Surveys of April 1999. SAIC Report No. 474 prepared for U.S. Army Corps of Engineers, New York District.
- Valente, R. M. 1998. August 1998 REMOTS® Survey of Historic Area Remediation Site (HARS) Cells 1, 2 and 3. Prepared for U.S. Army Corps of Engineers, New York District.
- Valente, R. M. 1998. Synthesis of Monitoring Results for the 1993 Dioxin Capping Project at the New York Mud Dump Site. SAIC Report No. 430 prepared for U.S. Army Corps of Engineers, New York District.
- Carey, D. and R. M. Valente. 1997. Dredged Sediment Management Study: Long Island Sound Regulatory Summary Document. Prepared for Connecticut Department of Environmental Protection, Office of Long Island Sound Programs.
- Valente, R.M. 1997. The 1997 Category II Capping Project at the New York Mud Dump Site: Results of the August 1997 Post-disposal REMOTS® Survey. SAIC Report No. 414 prepared for U.S. Army Corps of Engineers, New York District.
- Valente, R. M., G. Hodgson, and S. McChesney. 1996. December 1995 Investigation of Benthic Recolonization at the Mirs Bay Disposal Site. Report submitted by SAIC/Binnie Consultants Limited to the Geotechnical Engineering Office, Civil Engineering Department, Hong Kong Government.
- Valente, R. M. and G. Hodgson. 1995. 1994 Hypoxia and Mass Mortality Event in Mirs Bay. Binnie Consultants Limited Technical Report No. 0603/OTR-28. Geotechnical Engineering Office, Civil Engineering Department, Hong Kong Government.
- Valente, R.M. 1995. REMOTS® and Grab Survey to Assess Benthic Recolonization Following Backfilling at East Sha Chau (East) Marine Borrow Pit. BCL Report No. 0603/OTR-34. Geotechnical Engineering Office, Civil Engineering Department, Hong Kong Government.

- Weisberg, S. B., J. B. Frithsen, A. F. Holland, J. F. Paul, K. J. Scott, J. K. Summers, H. T. Wilson, R. M. Valente, D. G. Heimbuch, J. Gerritsen, S. C. Schimmel, and R. W. Latimer. 1993. EMAP-Estuaries Virginian Province 1990 Demonstration Project Report. EPA 600/R-92/100. U.S. Environmental Protection Agency, Environmental Research Laboratory, Narragansett, RI.
- Valente, R. M. and C. J. Strobel. 1993. EMAP-Estuaries Virginian Province: Quality Assurance Project Plan for 1993. U. S. Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratory, Narragansett, Rhode Island.
- Valente, R., J. Parker, and S. Browning. 1990. Preliminary Field Operations in Support of Disposal Site Designation in the Rhode Island Sound Region. DAMOS Contribution No. 79 (SAIC Technical Report 88/7525&C69), New England Division, U.S. Army Corps of Engineers, Waltham, Massachusetts.
- Rhoads, D. C., J. D. Germano, R. M. Valente and K. Kelly. 1988. REMOTS® Reconnaissance Mapping of Near-Bottom Dissolved Oxygen and Benthic Facies: Long Island Sound August 1987. SAIC Technical Report No. 88/7502&175. Submitted to U.S. Environmental Protection Agency, Region 1, Boston, Massachusetts.
- Valente, R. M. and J. D. Germano. 1987. REMOTS® Survey of Broad Sound, Massachusetts Bay. SAIC Technical Report No. 87/7511&141. Submitted to Stone and Webster Engineering Corporation, Boston, MA.